Fermilab Proposal No. 362

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Interaction of 200-400 GeV Pions With Emulsion Nuclei

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Date Received: November

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by

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Recently we have studied proton-Nucleon[1] and proton-Nucleus[2-4] interactions with 200 and 300 GeV proton beams at FNAL. These studies have been confined to the multiplicities and to the angular distributions of the shower particles produced in proton-nucleon and proton-nucleus interactions. Low multiplicity observed in complex nuclei does not depend upon the size or on the excitation of the target nuclei and is not expressed by the internuclear cascade models. It has been found that in the target nucleus A, the ratio $R_A = \langle N_s \rangle_{pA} / \langle N_{ch} \rangle_{pp}$, where $\langle N_s \rangle_{pp}$ is the mean p-p charge multiplicity and $\langle N_s \rangle_{pA}$ is the mean p-nucleus multiplicity in nucleus A is practically constant and increases very slowly with N_h value. The scaling relation in emulsion is given by $R_E = a+bN_h$ where $a = 1$ and $b = 0.06$. We also find that the rapidity distributions for p-nucleon and p-nucleus interactions are the same in the forward direction and are slightly different in the backward direction. The details of our experimental results are given in references (1-4).

Now we would like to use pion as a primary particle, and compare the results of (200-400) GeV proton beams with the pion (200-400) GeV beams results.

Exposure Details

For each beam we would like to expose a small stack of 25 pellicles of G-5. Illford emulsions of dimensions 10cm x 15cm x 600 micron to a flux density of 5×10^4 particles/cm^2 side in such a way that the beam is parallel

to the plane of the emulsion (along its 15cm length). The pellicles shall be scanned along the tracks.

References

1. P. L. Jain, Experiments on High Energy Particles Collisions, AIP Conference Proceedings No. 12, edited by R. S. Panvini (AIP, New York 1973) p141.

2. P. L. Jain, M. Kazuno, Z. Ahmad, B. Girard, G. Thomas, and H. Moses, Lett. Nuovo Cimento, 8, 921 (1973) and 9, 113 (1974).

3. P. L. Jain, M. Kazuno, G. Thomas, and B. Girard, Phys. Rev. Lett. 33, 660 (1974).

4. P. L. Jain, M. Kazuno, G. Thomas, and B. Girard (Submitted for publication)